

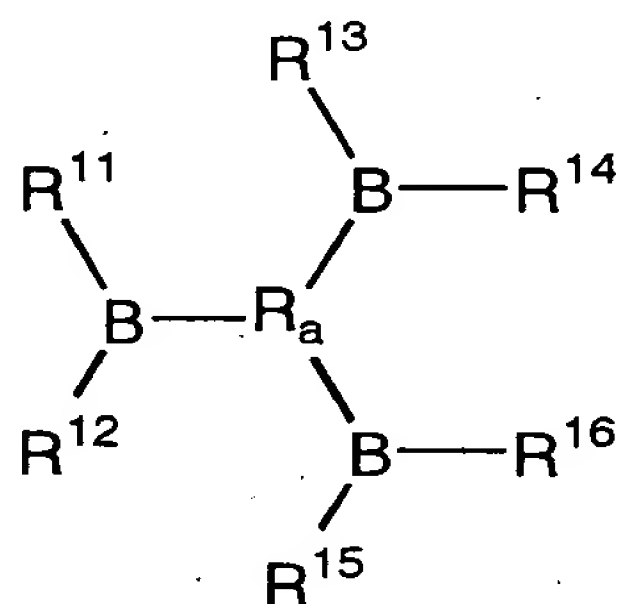
CLAIMS

SUB A, >

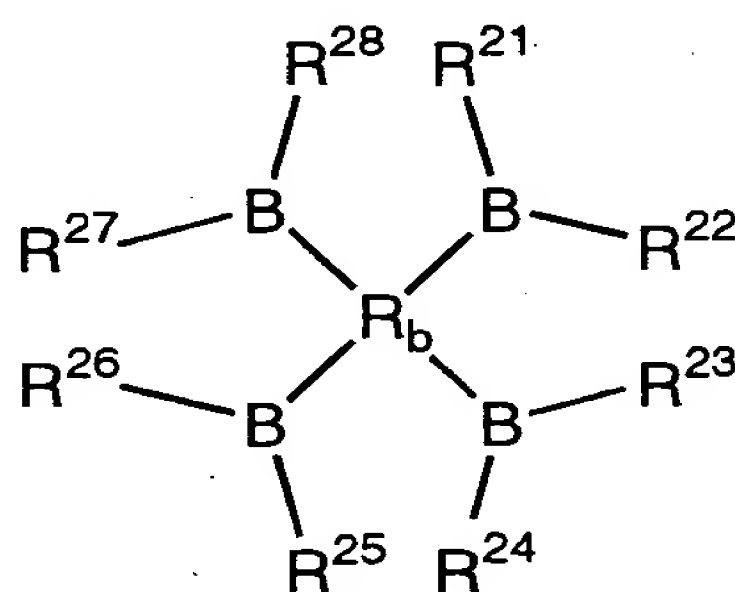
1. A polymeric electrolyte made of an electrolytic salt and a polymeric compound forming a complex with the electrolytic salt, characterized by containing a compound having boron atoms in the structure.

2. The polymeric electrolyte according to claim 1, characterized in that the compound having boron atoms in the structure is one or more selected from the group consisting of compounds represented by the following general formulas (1) to (4).

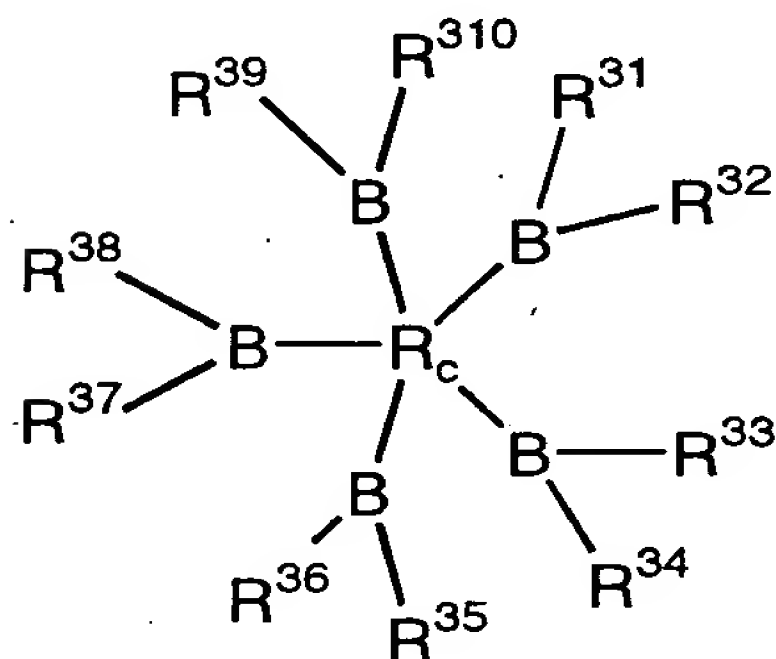
general formula (1)



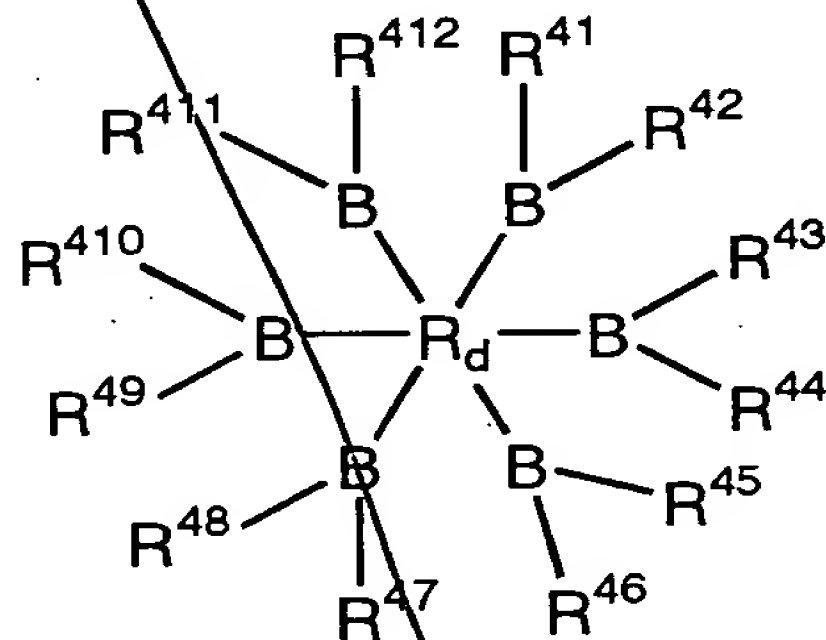
general formula (2)



general formula (3)



general formula (4)



wherein

R^{11} , R^{12} , R^{13} , R^{14} , R^{15} and R^{16} in formula (1), R^{21} , R^{22} , R^{23} , R^{24} , R^{25} , R^{26} , R^{27} and R^{28} in formula (2), R^{31} , R^{32} , R^{33} , R^{34} , R^{35} , R^{36} , R^{37} , R^{38} , R^{39} and R^{310} in formula (3), and R^{41} , R^{42} , R^{43} , R^{44} , R^{45} , R^{46} , R^{47} , R^{48} , R^{49} , R^{410} , R^{411} and R^{412} in formula (4), which may be the same or different, each represent a hydrogen atom, a halogen atom or a monovalent group, or are bound to each other to form a ring,

R_a in formula (1) represents a group having a site capable of being bound to at least 3 boron atoms which are the same or different, R_b in formula (2) represents a group having a site capable of being bound to at least 4 boron atoms which are the same or different, R_c in formula (3) represents a group having a site capable of being bound to at least 5 boron atoms which are the same or different, and R_d in formula (4) represents a group having a site capable of being bound to at least 6 boron atoms which are the same or different.

3. The polymeric electrolyte according to claim 2, characterized in that R^{11} , R^{12} , R^{13} , R^{14} , R^{15} , R^{16} , R^{21} , R^{22} , R^{23} , R^{24} , R^{25} , R^{26} , R^{27} , R^{28} , R^{31} , R^{32} , R^{33} , R^{34} , R^{35} , R^{36} , R^{37} , R^{38} , R^{39} , R^{310} , R^{41} , R^{42} , R^{43} , R^{44} , R^{45} , R^{46} , R^{47} , R^{48} , R^{49} , R^{410} , R^{411} and R^{412} are one or more groups selected from the member consisting of an alkyl group, an aryl group and fluorine-substituted derivatives thereof.

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C2
4. The polymeric electrolyte according to any one of claims 1 to 3, characterized in that the polymeric compound is one or more selected from the group consisting of a polyalkylene, a polyether, a polyester, a polyamine, a polyimide, a polyurethane, a polysulfide, a polyphosphazene, a polysiloxane, derivatives thereof, copolymers thereof and crosslinked products thereof.

5. The polymeric electrolyte according to any one of claims 1 to 3, characterized in that the polymeric compound is one or more selected from the group consisting of a polyalkylene oxide, polyvinylidene fluoride, polyhexafluoropropylene, polyacrylonitrile, polymethyl methacrylate, derivatives thereof, copolymers thereof and crosslinked products thereof.

6. The polymeric electrolyte according to any one of claims 1 to 5, characterized in that the electrolytic salt is a metallic salt.

7. The polymeric electrolyte according to claim 6, characterized in that the metallic salt is a lithium salt.

8. The polymeric electrolyte according to claim 7, characterized in that the lithium salt is one or more selected from the group consisting of LiBF_4 , LiPF_6 , LiClO_4 , LiAsF_6 , LiCF_3SO_3 , $\text{LiN}(\text{CF}_3\text{SO}_2)_2$, $\text{LiN}(\text{C}_2\text{F}_5\text{SO}_2)_2$, $\text{LiC}(\text{CF}_3\text{SO}_2)_3$, LiCl , LiF , LiBr , LiI , derivatives thereof and like.

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C3
9. The polymeric electrolyte according to claims 1

to 8, characterized by further containing a nonaqueous solvent.

10. The polymeric electrolyte according to claim 9, characterized in that the nonaqueous solvent is an aprotic solvent.

11. The polymeric electrolyte according to claim 10, characterized in that the aprotic solvent is one or more selected from the group consisting of carbonates, lactones, ethers, sulfolanes and dioxolanes.

12. The polymeric electrolyte according to claims 1 to 11, characterized in that the molar ratio of the compound having boron atoms in the structure to the electrolytic salt is 0.1:100 to 300:100.

13. An electric device using the polymeric electrolyte according to any one of claims 1 to 12.

14. A cell in which a positive electrode and a negative electrode are linked through the polymeric electrolyte according to any one of claims 1 to 12.

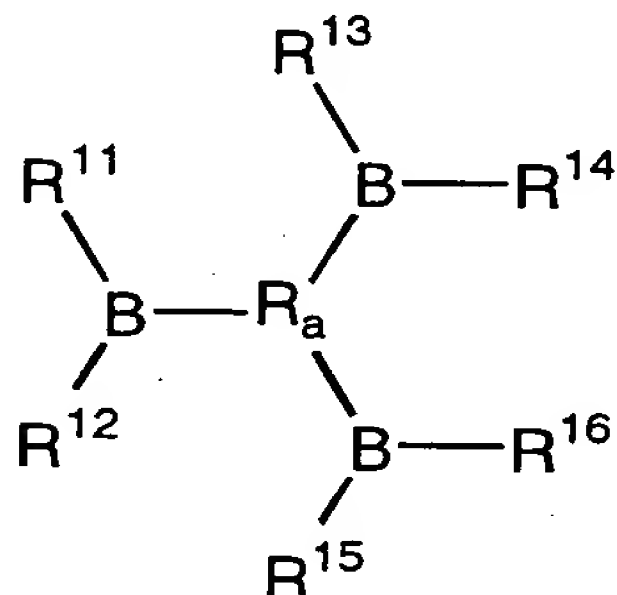
15. The cell according to claim 14, characterized in that the positive electrode is made of a double metal oxide capable of occluding and releasing lithium ions, and the negative electrode is made of a lithium metal, a lithium alloy or a compound capable of reversibly occluding and releasing lithium ions.

16. A nonaqueous electrolyte made of an electrolytic

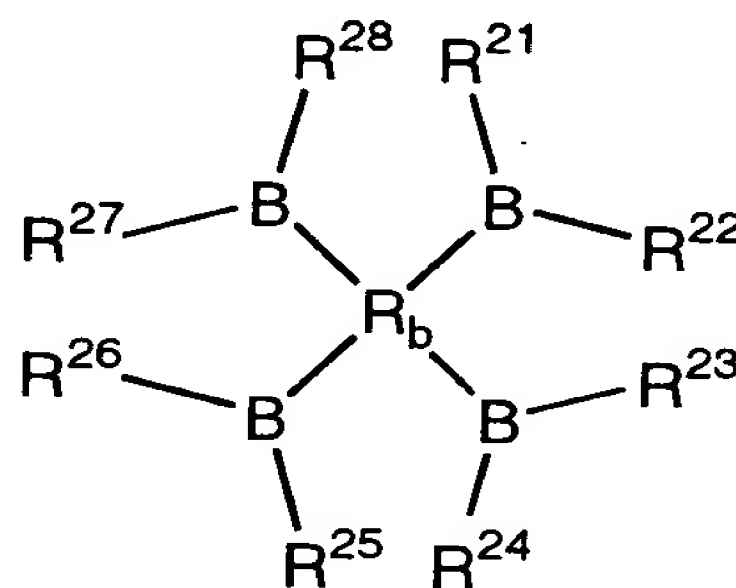
salt and a nonaqueous solvent that dissolves the electrolytic salt, characterized by containing a compound having boron atoms in the structure.

17. The nonaqueous electrolyte according to claim 16, characterized in that the compound having boron atoms in the structure is one or more selected from the group consisting of compounds represented by the following general formulas (1) to (4)

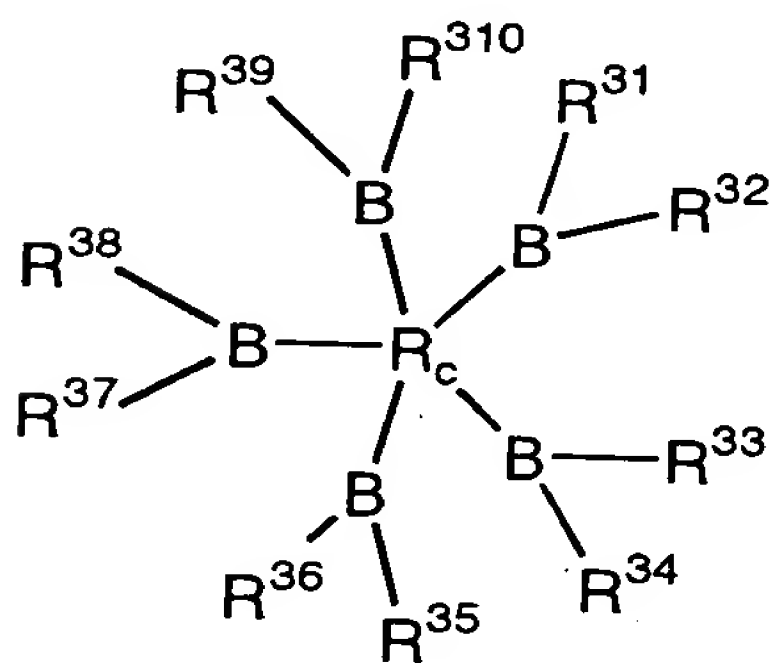
general formula (1)



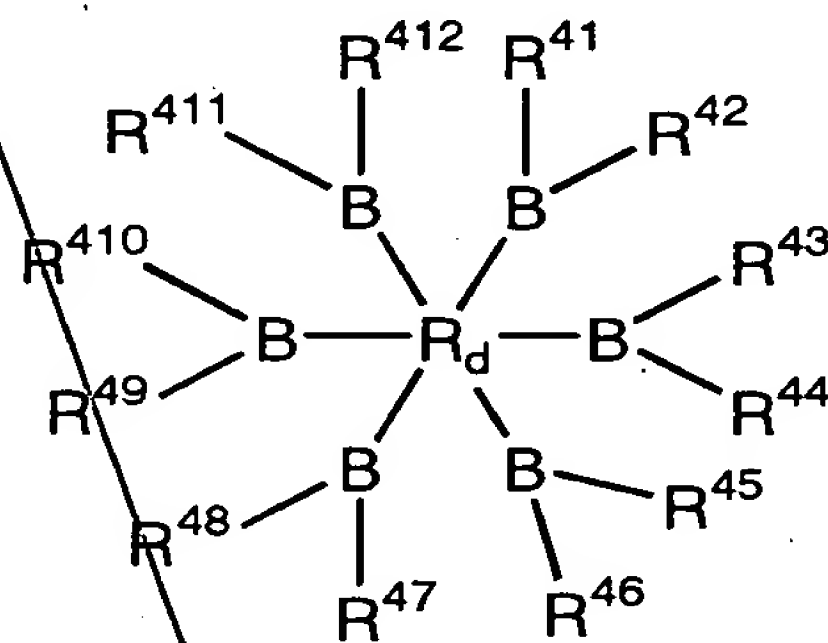
general formula (2)



general formula (3)



general formula (4)



wherein

R^{11} , R^{12} , R^{13} , R^{14} , R^{15} and R^{16} in formula (1), R^{21} , R^{22} , R^{23} , R^{24} , R^{25} , R^{26} , R^{27} and R^{28} in formula (2), R^{31} , R^{32} , R^{33} , R^{34} ,

R^{35} , R^{36} , R^{37} , R^{38} , R^{39} and R^{310} in formula (3), and R^{41} , R^{42} , R^{43} , R^{44} , R^{45} , R^{46} , R^{47} , R^{48} , R^{49} , R^{410} , R^{411} and R^{412} in formula (4), which may be the same or different, each represent a hydrogen atom, a halogen atom or a monovalent group, or are bound to each other to form a ring,

Ra in formula (1) represents a group having a site capable of being bound to at least 3 boron atoms which are the same or different, Rb in formula (2) represents a group having a site capable of being bound to at least 4 boron atoms which are the same or different, Rc in formula (3) represents a group having a site capable of being bound to at least 5 boron atoms which are the same or different, and Rd in formula (4) represents a group having a site capable of being bound to at least 6 boron atoms which are the same or different.

18. The nonaqueous electrolyte according to claim 17, characterized in that R^{11} , R^{12} , R^{13} , R^{14} , R^{15} , R^{16} , R^{21} , R^{22} , R^{23} , R^{24} , R^{25} , R^{26} , R^{27} , R^{28} , R^{31} , R^{32} , R^{33} , R^{34} , R^{35} , R^{36} , R^{37} , R^{38} , R^{39} , R^{310} , R^{41} , R^{42} , R^{43} , R^{44} , R^{45} , R^{46} , R^{47} , R^{48} , R^{49} , R^{410} , R^{411} and R^{412} are one or more groups selected from the member consisting of an alkyl group, an aryl group and fluorine-substituted derivatives thereof.

19. The nonaqueous electrolyte according to any one of claims 16 to 18, characterized in that the electrolytic salt is a metallic salt.

20. The nonaqueous electrolyte according to claim 19, characterized in that the metallic salt is a lithium salt.

21. The nonaqueous electrolyte according to claim 20, characterized in that the lithium salt is one or more selected from the group consisting of LiBF_4 , LiPF_6 , LiClO_4 , LiAsF_6 , LiCF_3SO_3 , $\text{LiN}(\text{CF}_3\text{SO}_2)_2$, $\text{LiN}(\text{C}_2\text{F}_5\text{SO}_2)_2$, $\text{LiC}(\text{CF}_3\text{SO}_2)_3$, LiCl , LiF , LiBr , LiI , derivatives thereof and the like.

22. The nonaqueous electrolyte according to claims 16 to 21, characterized in that the nonaqueous solvent is an aprotic solvent.

23. The nonaqueous electrolyte according to claim 22, characterized in that the aprotic solvent is one or more selected from the group consisting of carbonates, lactones, ethers, sulfolanes and dioxolanes.

24. The nonaqueous electrolyte according to any one of claims 16 to 23, characterized in that the molar ratio of the compound having the boron atoms in the structure to the electrolytic salt is 0.1:100 to 300:100.

25. An electric device using the nonaqueous electrolyte according to any one of claims 16 to 24.

26. A cell in which a positive electrode and a negative electrode are linked through the nonaqueous electrolyte according to any one of claims 16 to 24 and a separator.

27. The cell according to claim 26, characterized in that the positive electrode is made of a double metal oxide

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ble of reversibly
